SEC. 87.601. APPARATUS.

The following apparatus used in performing the test for expansive soils described in this chapter shall meet the hereinafter prescribed standards:

(a) MOLD. The mold shall be cylindrical in shape, made of metal and have the capacity and dimensions prescribed in Figure 2 of this section. The mold shall have a detachable collar with a mark 2.00 inches above the base. The lower section of the mold shall be designed to retain a removable ring of stainless steel or other acceptable material 1.00 inches in height, 4.01 inches internal diameter and at least 0.120 inches of wall thickness.

(b) TAMPER. The metal tamper shall have a 2 inch diameter circular face and weigh 5.5 pounds and shall be so arranged as to control the height of drop and permit a free fall of 12 inches above the top of the soil in the mold.

(c) BALANCE. The balance or scale used in the test shall have a capacity of at least 1000 grams and shall be sensitive to 0.1 grams.

(d) DRYING OVEN. The drying oven shall be thermostatically controlled and be capable of maintaining a temperature of 230 plus or minus 9 degrees fahrenheit (110 plus or minus 5 degrees centigrade).

(e) STRAIGHT EDGE. A steel straight edge 12 inches in length having one beveled edge.

(f) SIEVES. A No. 4 (4.76 mm.) sieve conforming to American Society for Testing Materials specifications for sieves for testing purposes (ASTM designation E-11).

FIGURE 2, EXPANSION MOLD

CHAPTER 6. TEST FOR EXPANSIVE SOILS

SEC. 87.601. APPARATUS.

The following apparatus used in performing the test for expansive soils described in this chapter shall meet the hereinafter prescribed standards:

(a) MOLD. The mold shall be cylindrical in shape, made of metal and have the capacity and dimensions prescribed in Figure 2 of this section. The mold shall have a detachable collar with a mark 2.00 inches above the base. The lower section of the mold shall be designed to retain a removable ring of stainless steel or other acceptable material 1.00 inches in height, 4.01 inches internal diameter and at least 0.120 inches of wall thickness.

(b) TAMPER. The metal tamper shall have a 2 inch diameter circular face and weigh 5.5 pounds and shall be so arranged as to control the height of drop and permit a free fall of 12 inches above the top of the soil in the mold.

(c) BALANCE. The balance or scale used in the test shall have a capacity of at least 1000 grams and shall be sensitive to 0.1 grams.

(d) DRYING OVEN. The drying oven shall be thermostatically controlled and be capable of maintaining a temperature of 230 plus or minus 9 degrees fahrenheit (110 plus or minus 5 degrees centigrade).

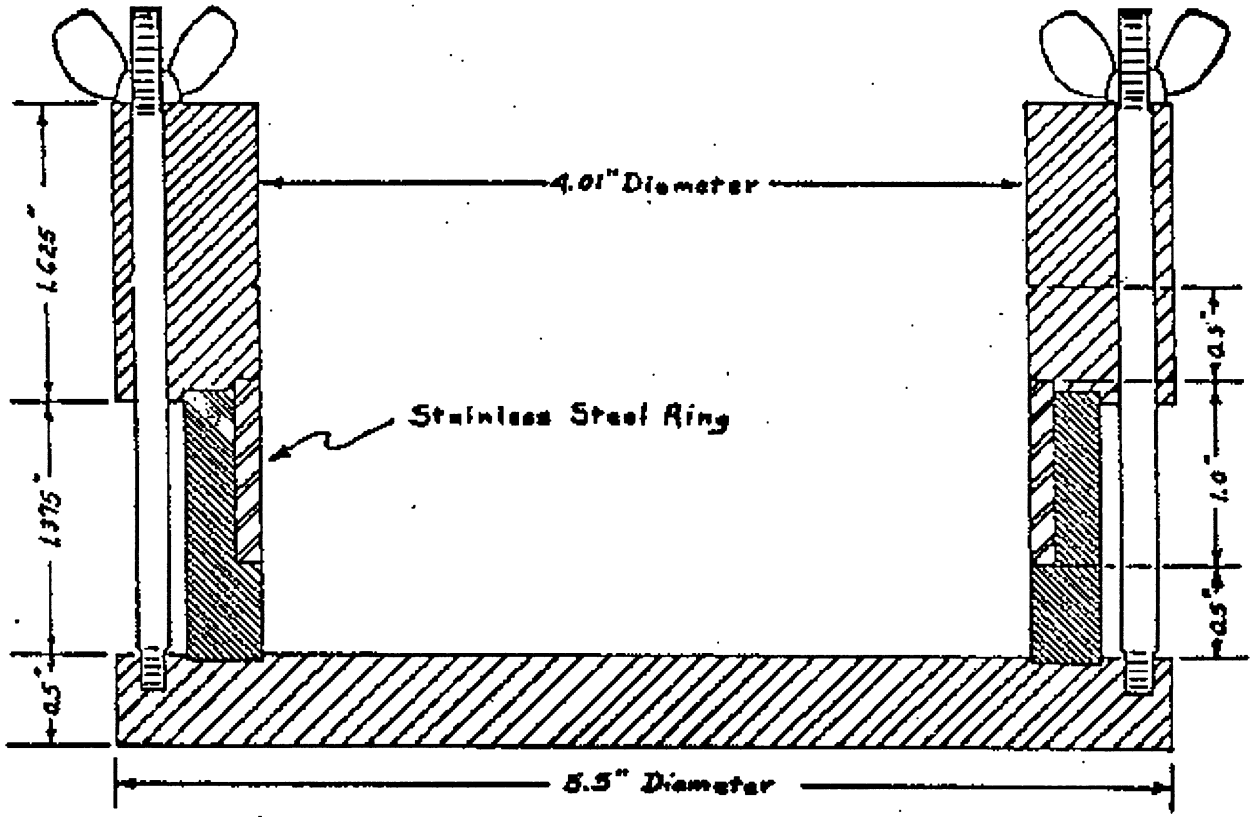
(e) STRAIGHT EDGE. A steel straight edge 12 inches in length having one beveled edge.

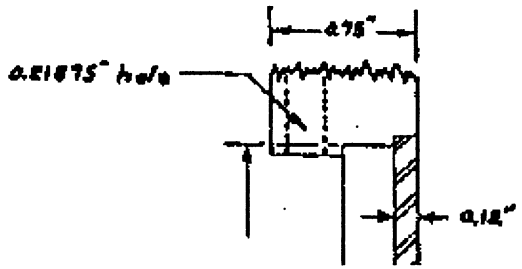
(f) SIEVES. A No. 4 (4.76 mm.) sieve conforming to American Society for Testing Materials specifications for sieves for testing purposes (ASTM designation E-11).

FIGURE 2, EXPANSION MOLD

Figure 2

Expansion Mold





Full Scale

SEC. 87.602. SAMPLE PREPARATION.

(a) A sample of the soil to be tested shall be sufficiently dry so that it is friable under a trowel. If drying of the sample is required the sample shall be dried in such manner that the temperature thereof does not exceed 140 degrees fahrenheit (60 degrees centigrade) at any time.

(b) The dry sample shall be broken up in such manner as to avoid reducing the natural size of individual particles, provided, however, if particles larger than 1/4 inch in diameter are possibly expansive, they shall be broken up so as to pass through a No. 4 sieve. An adequate quantity of the representative broken up sample shall be sieved through a No. 4 sieve. A record of the percentage of coarse material not passing through the sieve shall be made.

(c) A representative sample (hereinafter referred to as the test sample) weighing approximately 2 pounds or more of the sieved sample shall be selected for testing.

SEC. 87.603. MOLDING SPECIMEN.

(a) The test sample shall be thoroughly mixed with sufficient distilled water to bring the soil to optimum moisture content as determined by American Society for Testing Materials standard designation D-1557-58T, modified to use three layers in lieu of five. After the test sample is so mixed with water, the test sample shall be sealed in an air-tight container for a period of at least eight hours.

(b) After the test sample has been prepared as specified in Paragraph (a) of this section, it shall be formed into a specimen by compacting in the 4.01 inch diameter mold in two equal layers to give a total compacted depth of approximately 2 inches. Each layer shall be compacted by twelve uniformly distributed blows of the tamper dropping free from a height of 12 inches above the top of the soil when a sleeve type rammer is used, or from a height of 12 inches above the approximate elevation of each finely compacted layer when a stationary type mounted tamper is used. During compaction the mold shall rest on a uniform, rigid foundation such as is provided by a cube of concrete weighing not less than 200 pounds.

(c) Following compaction of the specimen, the upper and lower portions of the mold shall be removed from the inner ring and the top and bottom edges of the compacted specimen trimmed by means of a straight edge, and the compacted specimen weighed.

SEC. 87.604. MOISTURE TEST.

Immediately following compaction, a representative sample for moisture content determination shall be taken from the material trimmed from the top and bottom of the compacted specimen. Such representative sample shall weigh not less than 100 grams and shall be taken from trimmings most representative of the specimen to be tested for expansion. Such representative sample shall be weighed immediately, the weight recorded and the sample thereafter dried in an oven at 230 plus or minus 9 degrees fahrenheit (110 plus or minus 5 degrees centigrade) for at least twelve hours or to a constant weight, thereafter weighed, and the weight recorded.

SEC. 87.605. EXPANSION MEASUREMENT.

(a) The compacted specimen shall be placed in a consolidometer or equivalent loading device with porous stones at the top and bottom. A total load of 12.63 pounds, including the weight of the confining ring, the upper porous stones and any unbalanced weight of the loading machine, shall be placed on the specimen. The compacted specimen shall be allowed to consolidate under this load for a period of ten minutes, after which time an initial reading on the consolidometer dial indicator shall be made to an accuracy of 0.0005 inches.

(b) Thereafter distilled water shall be added to the pan containing the compacted specimen until the specimen is fully submerged in distilled water following which periodic readings of the consolidometer dial indicator shall be made until the rate of expansion becomes less than 0.0001 inch per hour, provided, however, the compacted specimen shall be submerged for not less than three hours.

(c) Upon completion of the procedures described above in this section the compacted specimen shall be removed from the loading machine and weighed to the nearest 0.1 gram.

SEC. 87.606. RESULTS.

The results of the expansion index test shall be expressed as a percentage of increase in the compacted specimen as compared to its initial height. The statement of results of the test shall include a statement of the molding moisture content and the initial dry density of the specimen.